VIRGINIA DEPARTMENT OF TRANSPORTATION

POST CONSTRUCTION MANUAL
(IMPERIAL & METRIC)

PREPARED IN THE OFFICE OF THE
STATE CONSTRUCTION ENGINEER

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CONTENTS

Page

INTRODUCTION

Guidelines for the Review and Preparation of Final Estimates

INTRODUCTION:

The review and preparation of final estimates requires the coordinated effort of the Location and Design, Construction, Fiscal, Internal Audit, Structures and Bridge, and Materials Divisions. However, it is basically the responsibility of the District Administrator to utilize the District Design Units as the primary sources in completing Final Estimates. This responsibility was assigned to the District Engineers in a joint memorandum (dated May 7, 1964) by the Director of Engineering and the Director of Operations.

The objective in preparing a Final Estimate is to determine that the records present a factual representation of the work done by the contractor on a project. It is necessary to determine that all work was done in accordance with the plans and specifications (including authorized changes), and that all required documentation of records is available and included in the final assembly.

It is the intent of these guidelines to establish uniformity in the review and preparation of these estimates. As in every operation of this nature, there exists some variation in district operational procedures; however, these differences should not vary from the basic principal and flow as presented herein.

In certain instances, the nature of the project (complexity, size, or an unusually large number of items included in the contract) will require some deviation from regular procedure in order to meet the date for final payment. Such deviations should occur only when the procedures outlined herein will cause an untimely delay, and then they must be evaluated to assure that the validity of the estimate will not be jeopardized. Any deviation from prescribed procedures must be documented and be included in the project files.

PRE PROJECT ACCEPTANCE:

Time becomes a critical factor in the final estimate and project review because final monies become due within **ninety (90) days** after project acceptance from the contractor. It is essential that every effort be made to complete as much work as possible prior to the Department's acceptance of the project.

Consideration is to be given to the following:

(A) EXCAVATION

(1) Payment on Plan Quantity Basis

Upon receipt of Slope Stake Notebooks, the District Design Unit should check the Levels and Cross Section Notes for those locations to be covered by Final Cross Sections (i.e., entrances, channel changes, borrow pits, etc). From there, the District Design Unit should plot and check sections and save the information for use when further data is available.

(2) Payment on Final Cross Section Basis

Upon receipt of Slope Stake Notebooks, all centerline levels and cross section notes (in addition to those items outlined in A(l) above) should be checked. Plot and check cross sections and save the information for use when further data is available.

When possible, Final Cross Sections are to be taken as work on the project progresses and it shall be the responsibility of the Resident Engineer to assure that the field notes on all items are transmitted to the District Office for checking and incorporation into the Final Estimate.

(B) BRIDGES AND CULVERTS

"As-built" plans are needed for all bridge projects and special design box culverts. The project inspector shall prepare "as-built" plans or other records as designated, showing the dimensions of the parts of the structure that were changed during construction. This generally consists of excavation, pile lengths, footing depths, column lengths and reinforcing steel weight. The dimensions which differ from the plans should be converted into computed quantities (decrease or increase) by the Inspector. The district Structure and Bridge office will prepare "as built" plans from the information and "as built" plans furnished by the inspector.

When bridges and box culverts are completed prior to other items of contract work, data should be promptly forwarded to the district office. Upon receipt of this data, the District Structures and Bridge Engineer or Transportation Engineering Program

Supervisor should proceed immediately to have these items verified in accordance with current directives listed within these guidelines.

(C) MISCELLANEOUS

While conditions and circumstances vary from project to project, the winter months often provide an opportunity for checking notebooks before final acceptance. For example, contract work may be complete, other than the final surface course or surface treatment, but is placed under shutdown for the winter while acceptance has already been made of the completed items of work. Bridges may be complete except for minor items of finish work not affecting the tabulation of quantities. In these situations, virtually all detail checking can be completed without having to be redone after acceptance. It will be the responsibility of the Resident Engineer to advise the District Administrator of any circumstance requiring accelerated operation.

AFTER FINAL PROJECT ACCEPTANCE :

(A) SUBMISSION OF PROJECT RECORDS TO DISTRICT OFFICE

The Resident Engineer has the responsibility for the assembly, residency review, verification and submission of all required project records (as listed in these guidelines) including additional information necessary for the proper computation or documentation of quantities.

This submission should be made as soon as possible after project acceptance; however, the District Administrator shall establish the due dates for the district. Only with rare exception should the given time limit exceed **ten (10) days** after project acceptance.

(B) DATA DISTRIBUTION

The data referred to in Section A shall consist primarily of the following items. This data shall be directed to the District Contract Administrator or District Design Unit Supervisor (in accordance with established district procedures) for distribution to district staff units or consultant charged with the responsibility of completing the review and estimate as follows:

(1) DISTRICT CONTRACT ADMINISTRATOR

(a) ALL PROJECTS

Semi-final estimate, tabulation of shutdowns, certification of payment for materials, labor, equipment and supplies for unbonded projects, Form C-36 (Contractor's Past Performance Report), Form ISD-20 (Pavement Description Information)

(b) FEDERAL AID PROJECTS

Form C-29 (Contractor's Certifications of Wage Rates and Job Classifications), Form C50 (Statement of materials and labor used by the Contractor). Letter from the Resident Engineer certifying that all payrolls are upto-date and on file in the Residency Office.

Note: Form C50 is not required for F.A.S. Projects or for projects with final construction costs totaling less than $1,000,000. Form C-29 is only required on federal aid projects which incude Form FHWA 1316.

Form ISD 20 is not required on Secondary Projects, projects not having pavement or surface courses, and for Urban Projects which the Department does not maintain.

(2) DISTRICT MATERIALS ENGINEER

Materials notebooks, plants diaries, letters listing the items accepted by visual inspection and the TL-28 forms.

(3) DISTRICT STRUCTURES AND BRIDGE ENGINEER

Bridge Diaries and "As-built" Plans.

(4) DISTRICT DESIGN UNIT (or DISTRICT CONTRACT ADMINISTRATOR)

"As-built" Roadway plans or other records which may be designated, roadway diaries, survey notebooks, weigh tickets, TL-102A forms, other data to support pay quantities and Federal Highway Inspection Reports.

(5) DISTRICT TRAFFIC ENGINEER

"As-built" Traffic Control Device plans and other records related to the installation of traffic control devices which are the responsibility of the Department for maintenance purposes. This information is for recordkeeping purposes only and not for completion of the review and estimate.

RESIDENCY - PROJECT PERSONNEL

PRIMARY PROCEDURES OF THE RESIDENT ENGINEER

1. Make final inspection of completed project and prepare a letter to the Contractor informing him of the acceptance of the project, addressing DBE goals/requirements within **5 days** of final acceptance.

2. Prepare a letter to the contractor requesting the submission of a letter certifying that materials, labor, equipment and supplies have been paid on unbonded projects and C-50 and Certification of Compliance on use of domestic material (as applicable).

3. Review and sign semi-final and any other data needed to complete the paper and/or book work within **10 days** of project acceptance.

4. Complete Form C-5 (reporting completion of project). Form C-5 must be sent to the district office the day or no later than the day after the project is accepted.

5. Complete Interim Form C-36 as each sub completes his work, not just at the end.

6. Verify form ISD-20.

The following data should then be submitted to the office of the District Administrator immediately after residency review.

1. All projects books (diaries, workbooks, "as-built" roadway plans, materials books, the Inspector's (marked) "B" bridge plans, and general notes book).

2. One copy of the semi-final estimate to be sent immediately.

3. Summary of shutdowns.

4. Letter from contractor certifying that materials, labor, equipment and supplies have been paid on unbonded projects.

5. Letter from Resident Engineer certifying all payrolls are up-to-date and on file in the Residency Office (Federal Aid Projects only).

6. Forms C-5, ISD-20, and C-36

7. Form C-50 required on Federal aid Projects where the total final construction cost is more than $1,000,000.

8. All other necessary supporting data, such as Form TL102A's, weigh tickets, and invoices to substantiate pay quantities.

9. Form to close out project. Form FD-55 (applicable to all road systems) and letter advising if final survey is warranted. This form to be filled out and returned to the Central Office after all project charges have been cleared (not within 10 days time frame).

All other project records are retained at the Residency.

PRIMARY PROCEDURES OF THE PROJECT ENGINEER

1. Review all project books and records for completeness.

2. Sign and date all project books.

3. Review semi-final estimate for completeness and accuracy.

4. Verify ISD-20.

All project books and records are to be delivered to the Resident Engineer.

PRIMARY PROCEDURES OF THE PROJECT INSPECTOR

1. Complete all books, and reports maintained during construction (as outlined in the Construction Manual).

2. Make inspection of the completed project.

3. Prepare a letter listing the items that were accepted by visual inspection.

4. Complete the semi-final estimate.

5. Prepare a letter summarizing all shutdowns.

6. Prepare a letter concerning the fulfillment of all Right of Way Agreements.

7. Prepare Form C-36, Interim and initiate C-36 for completion by Residency.

8. Initiate the preparation of Form C-5.

9. Prepare Form ISD-20.

10. Certify books (one certification should be adequate)

11. Prepare Form FD-55

12. Obtain signed, disposal and borrow pit releases from contractor.

All project books and records are to be delivered to the Project Engineer or to the Resident Engineer if no Project Engineer is assigned.

DISTRICT PERSONNEL

DISTRICT SURVEY REVIEW AND PREPARATION PROCEDURES:

BORROW PITS

Borrow pits must be cross sectioned, prior to topsoiling the borrow pit, using the same base line stations and bench marks used in staking out the borrow pits. Cross sections must be taken which insure an accurate computation of the volume of material removed. If it becomes necessary to take a final cross section at a point not covered by an original ground section, an original ground section must be interpolated and shown in the proper space in the Original Level Notebook. Furthermore, the actual beginning and ending of excavation must be shown. In the case of more than one borrow pit, the pits must be numbered to correspond with the number used in staking them out.

On projects requiring small quantities of borrow material and where actual measurements are difficult to obtain, payment may be made for as "load count measurement" as indicated in section 109.01 of the specifications. This applies, in particular, to "Minimum or No Plan" projects.

CONTRACT SURVEYING

The Contractor's field books as noted in the special provision, are to be turned in to the Project Inspector prior to making 100% payment for construction surveying.

DISTRICT DESIGN UNIT-REVIEW AND ESTIMATE PREPARATION PROCEDURES

An Engineer Technician Supervisor or Designer shall be assigned the direct responsibility for the preparation of a final estimate. This individual and subordinates or consultant shall review the construction plans, including all revisions, contract documents, special provisions, supplemental specifications, work orders, FHWA inspection reports, Materials Division depth checks, and noncompliance of material reports, and any correspondence or other reports affecting payment for work and materials on the project. Particular note shall be made of the edition of specifications and standards governing project construction.

With guidance from the Engineer Technician Supervisor, or Designer an Engineer Technician will generally function as a line supervisor, and they, with the assistance of technicians, will perform the necessary operations in the final review and estimate preparation process. Among the more significant are:

*(a) Check survey level and cross section notes. Check for completeness of coverage.

*(b) Utilizing the electronic line plotter; plot cross sections required by regular excavation projects. Check slopes for tolerances as required by the Road and Bridge Specifications, Section 303.

*(c) Compute and check earthwork volumes. The most practical and advanced methods shall be used to determine areas and volumes, programmable computers, etc. However, when conditions dictate the use of planimeter the areas shall be rechecked and any readings resulting in differences greater than one percent shall be rerun to insure that the area used will reflect the most accurate reading possible.

(d) Check project records and "As-built plans against contract, plans, work orders, standards, Road and Bridge specifications, etc. for compliance in execution of work.

*Not applicable on "Minimum or no Plan" projects.

(e) Review all geometric sketches shown in the work books, diaries, and/or "As-built" plans to assure that dimensions have been shown to achieve the desired degree of accuracy in computations of quantities.

(f) Check all mathematical formulas and computations for correctness and accuracy.

(g) Review diaries for content and sufficiency of records as outlined in Appendix C of the Construction Manual. (CM)

(h) Check the transfer of all items from diaries and/or "As-built" plans against the summaries or daily record of quantities. Check the totals of all summarized items.

(i) Verify that documents of items paid for on a tonnage (metric ton) basis are in compliance with current procedures outlined in the CM-Appendix C and the Manual of Instruction Materials Division, Chapter VII, (MOI-MD, Ch. VIII).

(j) Check the depth measurement Reports of pavement elements for compliance with specified tolerances. Verify deductions and adjustments in accordance with road and bridge specifications, Section 300, and CM-Div. III. Reports for non-compliance should be completed within two weeks of project acceptance.

(k) Check reports for noncompliance of materials and then compute price adjustments for noncompliance in accordance with Road and Bridge specifications, MOI-MD Ch. II, and contract special provisions.

(l) Verify that materials section has checked all materials notebooks for evidence of sufficient test quantities to cover all materials being shown for payment to the Contractor. Reference material covering this item can be found in the following: MOI-MD, road and bridge specifications, and the Construction Manual.

(m) Check all notebooks and records, for certification by the inspector, verification by the Project Engineer or Resident Engineer, as required by CM-Appendix C, and MOI-MD, Ch. VIII.

(n) Check weigh sheets, Form C-79, (Summary of Time, theoretical and other measurements), loose leaf diaries, and "As-built" plans (as applicable) for signatures in compliance with CM-Appendix C, MOI-MD, Ch. VIII.

(o) Prepare a draft of the final estimate.

(p) Prepare the tabulation of final versus contract quantities, including work orders and revisions, and reasons for differences between the two. This only applies to projects not covered by the Certification Acceptance Program as indicated by letters from the Location and Design Engineer, dated August 28, 1969

(q) Prepare review of the Final Assembly by separate letter or other acceptable format advising the District Administrator of review findings on the project. This is to include a statement as to the general degree of project compliance with plans and specifications, a comparison of semi-final and final quantities and reasons for variations between the two, work orders and comments concerning the adequacy and accuracy of project records.

(r) Assemble all data and supporting documents relative to the results shown on the final estimate voucher for an independent review and check.

(s) Verify quantities of work performed by State Forces and make certain that items are clearly separated from those performed by the Contractor.

An independent review and recheck will be performed to assure the thoroughness and accuracy of the initial review. The Transportation Engineering Programs Supervisor will determine the depth and scope of recheck required to assure the validity of the final estimate preparation procedures and the results obtained therefrom.

Upon completion of the recheck, the Contractor is to be notified that the Draft Final Estimate is available for review during the ten (10) day period specified in the Road and Bridge Specifications, Section 109. A copy of this notification should be forwarded to the Resident Engineer.

After review of the estimate by the Contractor or upon notification of intent not to review, the following data will normally be forwarded to the District Contract Administrator for assembly, review and signature by the District Administrator.

(a) Draft Final Estimate as applicable.

(b) Draft Final Assembly.

(c) "As-built bridge plans." (Retain for future reference.)

(d) Tabulation of price adjustments for noncompliance of materials, if not included in "Review of Final".

(e) All materials notebooks, diaries and TL 102A's.

Numbering of records and/or "As-built Roadway Plans" and entry into master file log should be completed as soon as all records are available to the Design Unit. All numbering and log maintenance is to be in accordance with the letter from the State Location and Design Engineer, dated December 5, 1967. Identification of the review and initial check and recheck will be made by notations on all applicable records. Each individual performing a check of original notes, corrections, or a recheck shall note in colored pencil the function performed, the date and his initials. In no case should the same color pencil be used for more than one purpose on a particular project. No summaries, sketches, or other records used for payment are to be filed without evidence that all entries and corrections have been checked. Adequate provisions shall be made to preserve and protect project records, "As-built" plans, and records while performing the final estimate and during the retention period thereafter.

Extreme care must be exercised in the time charged by Design Unit personnel to assure that only time actually spent performing activities directly related to the review and preparation of the final estimate is entered as a cost to the project. Unusual occurrences involving charges of time should be properly documented at the time of the occurrence and entered in the project file.

The retention and disposition of construction files have been reviewed with Department personnel and the Federal Highway Administration. It has been concluded that it is in our best interest to retain project records for five years following payment of the final voucher by FHWA. After the five year period, the records may automatically be disposed of by the residencies, districts and central office. (Fiscal Division sends out a list of projects that have been vouchered by FHWA).

Based on the requirements of the comptroller and the regulations of the Federal Highway Administration, there are two exceptions which we are listing below:

A. Records required for pending, ongoing or unresolved litigation, audits, or claims. These records must be retained until completion, resolution or settlements.

B. Toll facilities and revenue bond project records must be retained for three years subsequent to the date when the facility becomes operational on a toll free basis.

Divisions, districts and residencies should take immediate steps to dispose of all project records which have been retained for the five year retention period.

Federal regulations will allow the five year retention period to be reduced to three years; however, the Department at this time wants to continue with the five year program. After all of the records older than five years are disposed of, we will evaluate the desirability of changing the retention schedule to three years after payment of final voucher.

As built plans and materials test reports will continue to be microfilmed centrally and maintained in the central office, as well as the district offices.

In this manual, are many of the major items found on most contracts and which constitute the major portions of costs for most projects. The activities indicated should be performed.

To assist in the indexing of drainage structures for maintenance purposes, the design team assigned to a particular project will prepare a list of drainage structures having an opening of 36 square feet (3.3 square meters) or greater. This opening also applies to multi-lines of culverts, etc. This applies to structures that have been replaced, extended, or otherwise improved, and on which it becomes the Departments responsibility to maintain. Projects that will receive maintenance from cities are not to be assigned a structure number. The information supplied to the District Structures and Bridge Engineer should include the following; location, station and name of stream, street, length, square feet of opening, and type of structure; slab-span, special design, concrete pipe culvert, etc.

PROCEDURES FOR COMPUTING FINAL QUANTITY EXCAVATION BY DATA PROCESSING METHODS

1. Original cross sections will be used in lieu of Slope Stake cross sections whenever possible. However, when it is necessary to take Slope Stake cross sections, the Transportation Engineer in charge of survey will make the notebooks available to the Transportation Engineering Programs Supervisor upon completion of the Slope Stake survey.

2. After reviewing the cross sections for completeness, the data will then be processed by the District Design Unit.

*3. The District Designer will request edited cross section data and a digital listing showing error indications.

4. The District Design Unit will correct the listing and resubmit any corrections or update of files. If applicable, survey files will at that time be returned to the Transportation Engineer.

*5. A corrected digital cross section listing will be obtained. Should plotted original cross sections be desired at this time, these will be requested by the District Design Unit and plotter information will be developed and supplied by the Richmond Central Office Information Systems Division. (This will be necessary for urban and certain other projects which will use these plotted sections for developing further final data by manual methods).

*Certain elements of these steps will be accomplished by means of on Line Remote Tele-processing Terminals.

6. District design personnel will prepare electronic computer input data for the development of Theoretical Digital Roadway Design based on the Slope Stake survey. This will require either of the following:

(a) Reviewing and updating previously coded data which was used for original design purposes.

(b) Complete coding of input data for projects which did not use computer methods in original design.

This work should be accomplished as soon as possible after the corrected cross section information is available to the District Office.

*7. The District Design Unit will develop and maintain roadway design information in their computer files using Slope Stake survey and input controls as mentioned above.

8. When final survey is completed, the survey files will be received by district design personnel for processing and editing.

*9. The District Design Unit will process and edit final cross section data and obtain a digital cross section listing showing the errors.

10. The District design Unit will make the necessary corrections to the cross section listing.

*11. The District Design Unit will compute Earthwork Areas and Volumes using slope stake and final cross sections.

12. The Design Unit will prepare plotter data and furnish plotted cross section information to the District Design Unit for the following:

(a) Original cross section and/or slope stake cross section (as applicable)

(b) Final "As Built" Survey

(c) Theoretical design

*In certain urban and other projects the theoretical design can not be plotted by electronic means and must be added manually. Steps 10-12 above should be completed and data returned to the District Design Unit within 30 days of receipt of the final cross section survey.

*13. Upon receipt of the data indicated in item 12, the final review unit will proceed to verify the actual final pay quantities as indicated.

*Certain elements of these steps will be accomplished by means of on Line Remote Tele-processing Terminals.

PROCEDURES FOR THE REVIEW AND PREPARATIONS OF BRIDGE FINALS, DISTRICT STRUCTURES AND BRIDGE OFFICE

Before final acceptance, the bridge should be inspected by the District Structures and Bridge Engineer for general conformity to contract, plans and specifications, and then accepted as complete after any necessary corrections have been made by the Contractor.

The following steps should be followed by personnel preparing bridge finals after the project is completed and accepted:

1. Receive the "As-built" Plans, Diaries, Delivery Tickets, Pile Driving Records, Summary of Quantities, Reason For Differences and a copy of the Construction Workbook Data Disk from the District Contract Administrator.

2. Obtain project folder from District Contract Administrator to review the contract and all work orders.

3. Obtain approved shop drawings from reviewing authority (VDOT/Consultant).

4. Verify that the Inspector has marked in red any changes on the BW prints such as elevations, dimensions, footing depths (showing average depths in feet and to the nearest tenth of a foot) etc. The inspector should provide sketches of pile layouts consisting of pile locations, test piles, north arrow and identification number of each pile to correspond to the pile driving records and show all information on BW Prints that is necessary for computation of final quantities.

5. Verify that alterations in construction are minor and reasonable or in accordance with general notes, specifications, work orders or as directed by the Engineer. Call in the Project Inspector (if needed) to explain any discrepancies or answer questions the checker may have.

6. Check Inspector's computations of quantities in red with light check marks near the Inspector's figures. When computations disagree with those of the Inspector, mark corrections nearby, making the computations as brief as possible. Never erase, mark over, or alter any of the Inspector's recorded data. The names of the checker and rechecker shall be noted on the front cover of the document being checked, along with the date and the function performed, with the same color pencil used while performing the function. Project records shall not be submitted for filing without appropriate signatures.

7. Check delivery tickets, Form C-79 and loose leaf diaries for signatures in compliance with Construction Manual - Appendix C and the Manual of Instruction - Materials Division, Chapter VIII.

8. For bridge projects included in roadway contracts, prepare estimate and combine with roadway estimate for contractor's review.

9. For bridge only contracts, contact district Materials Section to verify that contract items are eligible for payment. Prepare estimate and transmit along with a copy of the district Material's letter of approval to the district Contract Administrator for contractor's review. After contractor's review of the final, complete the draft copy of the final estimate and return to the district Contract Administrator.

10. If a contract is for a federally funded project greater than $5,000,000.00 or a federally funded interstate project, complete Form C-55 and submit with the final estimate after the contractor's review.

11. Bridge and structure projects with plans, both contract and state forces work, shall be marked for the "as built" condition upon completion of the work. This shall include, but not limited to bridges, retaining walls, demolition plans if separate from structure plans and any other plan requires the posting of finals by the Structure and Bridge Division or which will be permanently filed within Structure and Bridge files for future reference. The appropriate entries on the ADP list shall be provided to maintain an accurate permanent record of completed construction. The "as built" plan preparation should be considered as important as the checking of the sketch books and the preparation of the final estimate for payment. Prepared correctly and thoroughly, the "as built" plans provide a permanent record of the actual structure features which may influence or affect future work at the project site.

    As soon as the construction field information is received from the district Contract Administrator, the original drawings for all project structures shall be requested by plan number in writing from the Central Office Structure and Bridge File Room.

    Since the final quantities have been approved for payment, the original drawings shall be marked for the "as built" condition. Items to be noted shall include, but not limited to, the actual quantities for field measured items, the pile lengths, field revised dimensions, voided sheets, types of materials actually used when options are shown on plans, specifics concerning types of paint systems and any departures from the original plans.

The title sheet shall be marked "AS BUILT" in large, bold letters next to the title block. Also, the drawings shall be marked "Finals posted by (name) district on (date of posting)" near the original plan date. "Bridge built by (contractor's name)" shall be shown. Small projects or projects not requiring revisions may be marked "Bridge/Structure built according to the plans, (date of posting)".

The word "ESTIMATED" in the Estimated Quantities block shall be deleted by marking through it with a single line and writing the word "Actual" immediately to the left of it. "As built" quantities and dimensions shall be shown by marking through the original figure with a single line and writing the revised figure either above or beside the original figure. Complete views shall be voided by diagonal hatch lines on the back of the drawing. The entire sheet shall be voided, where applicable, by writing the word "VOID" in large, bold letters across or near the title block. An additional sheet may be drawn to replace an original drawing or to document a major structural feature not provided for in the original drawings.

When the number of piles in a substructure element is ten or less, each pile length shall be noted above or beside the individual pile location on the drawing. When the number of piles in a substructure element exceeds ten, note only the maximum and minimum lengths of piles above or beside the individual pile locations which satisfy that criterion. A plan view of the footing outline with the pile locations and lengths shall be sketched on the drawing if not otherwise shown. The average length of piles in the substructure element shall be shown by writing "The average length of piles is ___ linear feet (meters)" near the pile location sketch.

Unusual utility items or other subsurface features such as old footings, etc., which may influence future work at the project site should be noted.

Sheets marked "File with Plan No. ___ until finals are posted", or similar wording, shall be withdrawn at this time from the original drawings and discarded.

Upon completion of the "as built" plans, the original drawings shall be transmitted back to the central office Structure and Bridge File Room for filing and eventual microfilming. The preparation and Transmittal of the "as built" plans should be considered a routine task within the scope of the finals posting process and performed in an expeditious manner in order to ensure an accurate permanent file record.

12. Bridge and structure projects without plans (i.e. SAAP projects) will require a Maintenance Data Sheet to include name of contractor, types of work performed, location of work, actual quantities, pertinent sketches

from SAAP contracts and types of materials such as expansion dams and paint systems or other special items used.

The Maintenance Data Sheet shall be marked "Finals posted by (name) District on (date of posting)" near the title block.

Upon completion of the "Maintenance Data Sheet" it shall be transmitted to the Structure and Bridge File Room for filing and eventual microfilming. The preparation and Transmittal of the "Maintenance Data Sheet" should be considered a routine task within the scope of the finals posting process and performed in an expeditious manner in order to ensure an accurate permanent file record.

13. Shop drawing shall be transmitted to the Structure and Bridge File Room for microfilming. Cut sheets shall be microfilmed as directed by the district Structure and Bridge Engineer.

14. The final records are then sent to the district Location and Design Section for filing.

15. Posting Final Quantities - Tabulate and index final quantities in inspectors summary for all pay items shown in the contract (including work orders) following the order shown on the plans. Substructure items are listed first and totaled before superstructure items are summarized.

16. The records are then cross checked, and the estimate and reasons for differences assembly is then sent to the District Design Unit.

17. If the contract was for a bridge project only; the final records are cross-checked. Notify the Resident Engineer by letter, advising of the time limit that the final can be reviewed by the contractor. After the Contractor's review of the Final, complete the draft copy of the final estimate.

18. Send final estimate and project folder to the District Contract Administrator. The final records are then sent to the Design Unit for filing.

19. Mark original structure plans for "As-built" conditions and transmit them to the Central Office for microfilming in accordance with instructions.

DISTRICT CONTRACT ADMINISTRATOR - REVIEW AND PREPARATION PROCEDURES

The District Contract Administrator is normally assigned the responsibility of performing the following functions relating to the flow of the final estimate within the District Office:

(a) Prepare Form C-26 Original and two (2) copies. (three (3) copies for Interstate and Fed. Aid major structures.) Check C-12 for accuracy of shutdowns and include one (1) copy of summary of shutdowns to each C-26. Prepare Form FD-1 if payment is due to the Contractor.

(b) Include Form C-55 - Original and two (2) copies (Two (2) additional copies for each additional Federal-Aid project number.) Note: Federal-Aid Interstate Projects or major structure.

(c) For contracts which are not covered by a payment bond, one (1) copy of the contractor's letter of certification regarding payment of bills, is required.

(d) Include C-50 - Original and two (2) copies (all Federal-Aid Projects except Federal-Aid Secondary, and projects for which the total final construction cost is less than $1,000,000).

(e) Include letter from Resident Engineer certifying that payrolls are up-to-date and are on file in the Residency Office - All Federal-Aid Projects - One (1) copy.

(f) Upon receipt of the items (a)-(e) referred to on page 12 of these guidelines, prepare copies of the final estimates and present the entire final assembly to the District Administrator, or his representative, for review and signature. Also submit the completed Form FD-55 for the District Administrator's signature and transmittal to the Project Control Section of the Fiscal Division.

(g) The above data, except Form FD-55, is to be submitted to the Construction Engineer as soon as the final is completed, but **not less than 10 days prior** to the due date for vouchering of the final estimate.

One copy of final estimate and one (1) copy each Form TL-131, or TL-131-2, together with attached sources of supply, etc. are to be sent to the State Materials Engineer.

(h) Maintenance Schedules

1. Verify pay quantities are correct

2. Prepare final estimate and review with contractor.

3. Once final estimate has been submitted, all project books, diaries, TL102A's and other records or documentation are to be given to the district Location and Design Engineer for the purpose of numbering and filing.

4. Submit final estimate data to the District Administrator and Construction Engineer as outlined in (f) and (g).

DISTRICT MATERIALS ENGINEER - REVIEW PROCEDURES

OPERATION AND PROCEDURES IN THE DISTRICT

Operation and Procedures in the District (For more detailed instruction on acceptance, reporting, and certification of materials, refer to the Manual of Instructions Materials Division.)

(a) Materials Notebooks are received from the District Design Unit or District Contract Administrator by cover letter.

(b) Materials records, test reports, and certifications are obtained from project files for checking.

(c) If project is a Special Project (Minimum or No-Plan, As Built, Safety, Signalization, etc.), refer to Sections 207 and 208, Manual of Instructions, for documentation procedures.

(d) Title sheet of the Materials Notebook is checked. Check the proper posting of Estimated Quantity of Materials, Work Orders, or any special handling of material quantities. Check to see if notebook has been signed by the Resident Engineer and Construction Project Engineer.

(e) Each item in the Materials Notebook is checked in red pencil denoting that the material meets VDOT specifications and that a test report, certification, etc. has been issued. All items are summarized. The summary is then checked against the section column showing the total test quantity. Quantities of tested materials must equal or exceed quantities of used material.

(f) All transfers of materials are cross-checked as being released from and received on a project (on the applicable items).

(g) Price adjustment data on specifications for central mixed aggregate, asphalt concrete, and any other materials on which price adjustment may have been applied, is checked. Standard deviation for variability (statistical specifications) from each source is checked and sent out, if this applies. Test reports and materials notebook are cross-checked with Form TL-102A to see if they agree.

(h) If a Federal Aid project is involved, the necessary number of Independent Assurance samples are checked, as well as the comparison with applicable acceptance samples and documented reasons for differences if necessary. (See Secs. 202 and 206, Manual of Instructions.)

(i) In the event of shortage of tested materials, Form TL102A, and delivery invoices are used to get test reports to cover any item, unless transfer forms (Form TL-15) are involved from another project.

(j) Verify all depth and density reports.

(k) Verify Form TL-136 reports for Independent Assurance depth and density tests, if required.

(l) The Finals Section and District Design Unit, are contacted to check for price adjustment data before computing the final quantities for final estimate on central-mixed aggregate and asphalt concrete. After computation of pay quantities for final estimate, a review is then made to see that tested quantities equal or exceed actual pay quantities for the final estimate.

(m) If a shortage of tested materials exists at the time of final checking, every effort is made to secure the necessary test or certification coverage for the item in question before releasing the final estimate. If coverage cannot be obtained at this time, an explanation of the documentation is made.

(n) If everything is in order, certification is attached to the Materials Notebook and signed by the District Materials Engineer.

(o) The District Materials Engineer then prepares a materials certification on Form TL-131 or TL-131-2 for the signature of the District Administrator and for transmittal to the Federal Highway Administration. The certification states that the appropriate reports covering tests or certifications as to the conformity with specifications of materials used on the project are on file by project number in the office of the District Materials Engineer.

A list of the sources of supply of major materials used on the project should be attached to the certification. Price adjustment sheets for any materials that are accepted outside of specification limits, and showing the extent to which they do not meet the specifications also are to be attached to the certification.

(p) This assembly is then forwarded to the District Design Unit Finals Section/District Contract Administrator by cover letter for issuance of the certification to the Federal Highway Administration.

(q) One (1) copy of the certification (TL-131 or TL-131-2), with attachments noted in Paragraph (o) above, is sent to the Federal Highway Administration, before payment can be made by them on a Federal Aid project.

One (1) copy of the certification with attachments noted and one (1) copy of estimate, are sent to the State Materials Engineer.

(r) The Materials Notebook is to be retained by the District Materials Engineer or District Design Unit Finals Section, until notification is received to purge/microfilm files. The Materials Notebook, prior to purging, will be subject to further review

and audit (on a random basis) by the office of the State Materials Engineer. (See "Materials Division-Operations and Procedures-Central Office" herein for additional details.)

DISTRICT TRAFFIC ENGINEER - PROCEDURE FOR RECORDKEEPING

The following steps should be followed by the District Traffic Engineering Section when the project is completed and accepted:

1. Receive the "As Built" Traffic Control Device plans and other records related to the installation of traffic control devices which are the responsibility of the Department for maintenance purposes.

2. File the applicable shop drawings for signal poles, lighting poles, overhead sign structures, other traffic control device structures and foundation designs for such with the "As Built" Traffic Control Device plans received in item 1.

3. Retain shop drawings until such structure is removed and no longer utilized. Retain "As Built" Traffic Control Device plans and other records until new construction provides new "As Built" Traffic Control Device Plans and other records.

4. Modify "As Built" Traffic Control Device plans when minor changes are made in the field by state forces or others and new "As Built" Traffic Control Plans are not required.

5. District Traffic Engineer should dedicate a specific location for these files to be retained in the District. In order to conserve space, microfilming of all data is allowable.

CENTRAL OFFICE PERSONNEL

MATERIAL DIVISION -

Operation and Procedures - Central Office

(a) After the receipt of final estimate and TL-131 with attachments, the Materials Division's General Services Section will randomly select projects to audit/review. Generally, 10 percent of the projects will be selected or a minimum of one (1) per month per District. The District Materials Engineer will be notified which projects have been selected, and will forward the Materials Notebook to the Central General Services Section for review. (See "Operation and Procedures in the District" herein.)

(b) The book is then reviewed and checked by the General Services Section using similar procedures, as outlined for the District Materials Engineer in the above noted section.

(c) Central files are checked against the Materials Notebook to determine that they contain all necessary test reports, etc. Any missing reports are obtained. These files are then maintained for the required retention period and are then microfilmed, so that they may be used for future reference.

(d) After determining that the Materials Notebook is in order, the General Services Section will return it with a transmittal letter to the District Contract Administrator for retention. If any discrepancies have been found during review, these will be noted in the transmittal letter together with any corrective measures necessary.

The complete final assembly is directed to the Program Support Technician ,Sr. of the Contract Administration Section. The Technician makes a general review of the assembly to determine whether the final is ready to be processed. As part of this general review, the office contract file folder is pulled and reviewed for any correspondence which would affect the processing of the final. The Program Support Technician, Sr. performs the following:

1. Review transmittal letter and assembly to determine that all data as listed and required has been submitted.

2. Make detailed check of Form C-26

3. Check to see that extensions of contract time are authorized by work order or shutdown.

4. Provide information to Program Support Technician for entry into the Project Tracking system or BAMS.

5. Prepare letter of transmittal to Fiscal Manager for signature of the Contract Administration Engineer.

6. Prepare letter of transmittal to the Federal Highway Administration for signature of the Contract Administration Engineer. Note: Not required for state funded or federal-aid secondary projects.

7. Determine if any notices of Intent to File Claim exist.

8. Final data assembly for the Fiscal Manager is given to the Contract Administration Engineer for signature.

9. The Contract Administration Engineer briefly reviews the assembly, and if found in order, signs the transmittal letter. The entire assembly is then submitted to the appropriate Assistant Construction Engineer for review and signing of the estimate. In the absence of the Assistant Construction Engineer, the Contract Administration Engineer makes the review and signs the estimate for the Assistant Construction Engineer.

10. After review by the Assistant Construction Engineer, the assembly is sent back to the Program Support Technician,Sr. for distribution.

11. Final assembly is distributed by the Program Support Technician,Sr.

DISTRIBUTION TO FISCAL MANAGER

1. Original of transmittal letter to Fiscal Manager.

2. Fiscal Division original Form FD-1 when payment is due contractor.

3. Original of Final Estimate

4. One copy of adjustment for non-compliance forms, when applicable.

5. Original and two copies of Form C-26 with summary of shutdowns.

6. One copy of letter from Contractor certifying he has paid all bills for materials, labor, and equipment on unbonded projects.

7. Copy of District Administrator's letter transmitting final assembly to the Construction
Division.

8. Letter from Resident Engineer certifying payrolls are up-to-date and are on file in the
Residency (Federal Aid Projects only).

DISTRIBUTION TO FEDERAL HIGHWAY ADMINISTRATION

1. Original of transmittal letter.

2. One copy of Form C-26 with a summary of shutdowns. (Only required on Interstate and Federal-Aid projects which have major structures.)

3. Two copies of Form C-55. (Applicable to Interstate and Federal-Aid Projects with Major Structures.)

4. Original and one copy of Form C-50 (PR-47), (when applicable). *

* Note: Not required for projects on the federal-aid secondary system, state funded projects, or when the final construction cost is less than $1,000,000.00.

No submission is required to the Federal Highway Administration for state or federal-aid secondary projects.

DISTRIBUTION TO CENTRAL FILE

1. One copy of transmittal letter to Fiscal Manager.

2. One copy of transmittal letter to FHWA (when applicable).

3. Original of transmittal letter from District.

4. One copy of Form C-50 (PR-47) and Form C-55 (when applicable).

5. One copy of Form C-26 with summary of shutdowns.

6. One copy of adjustment sheets for non-compliance (when applicable).

7. Letter from Resident Engineer certifying payrolls are up-to-date and are on file in the Residency. (federal aid projects only)

INTERNAL AUDIT DIVISION
REVIEW PROCEDURES - CENTRAL OFFICE

The Internal Audit Division is responsible for certifying that the TL-102A is representative of all information contained in the recorded tickets, so that the tickets may be destroyed and the *TL-102A can be retained as the certified record of material delivered to the project. The TL-102A's will be examined and certified during audits performed by the Internal Audit Division. The TL-102A is processed in the following manner:

The TL-102A is distributed after the inspector has verified that it represents the material received on the project. The original copy and all other data is processed up to the finalization state and filed, since it will be the certified record of material delivered to the job.

1. The Project Inspector processes and reconciles the tickets and the TL102A as set forth in the above paragraph.
2. The District Design Unit confirms that the TL-102A does represent the material used on the project as evidenced by the delivery tickets.
3. The Internal Audit Division will:

    a. Schedule audits periodically.

    b. Perform an audit of the tickets and TL-102A's in sufficient depth, to satisfy that the information on the tickets is represented on the * TL-102A.

    c. The audit will consist of:

        1.) A review of the check made by the District.

        2.) A detailed comparison of the day's weigh tickets and TL-102A's i.e., each item of basic information; Load No., Truck No., and remarks on the ticket. The extent of such comparison will depend on the number of types of material and the quantities of material.

        3.) Any errors detected will be recorded, evaluated and action taken when necessary.

* Copy must show "total adjusted weight" and be signed by the Project Inspector.

    d. Issue a certification that the TL-102A's are representative of the delivery tickets. This certification will be prepared in sufficient copies for distribution. Two (2) copies will be sent to the District Administrator, one (1) copy for filing with TL102A's and one (1) copy showing the date of ticket disposal to be returned for auditing.

State Material Engineer
District Administrator (File with TL-102A's)
Resident Engineer
Federal Aid Accountant
Federal Highway Administration
The Internal Audit Division
Central File

PROCEDURES FOR CHECKING INDIVIDUAL ITEMS

PROCEDURES FOR REGULAR EXCAVATION

1. Determine whether regular excavation is to be paid by plan quantity or by cross section.

2. Check the grading summary in the plans for the total plan quantity. If a project is not to be paid on plan quantity then obtain the slope books and final level books, check the computations, and plot cross sections.

3. Check plans for revisions of the plan quantity (increase or decrease) items.

    a. Compute a revised plan quantity and obtain the total quantity of topsoil removed from fill areas; from excavation notes, Inspector's cross sections or road design cross section.

    b. On "Minimum or No Plan" projects, extra excavation should be verified using either haul counts from the Inspector's notebook or actual computations of volumes from field measurements.

    c. Total the regular excavation summary.

4. Check computations on entrances, excavation below sub-grade, drain ditches and channel against the entries listed in the regular excavation (measured) summary. Total the quantity in the regular excavation (measured) summary.

5. Total the regular excavation summary quantity and the regular excavation (measured) quantity to obtain the total pay quantity.

6. Check the Inspector's regular excavation summary items against the Inspector's excavation notes.

7. Check the total pay quantity against the regular excavation quantity and change the actual quantity to the pay quantity if they are different.

At the discretion of the Design Unit Supervisor, the cross sections, both slope stake and final, can be checked and plotted utilizing electronic data processes. Excavation quantities can also be obtained by this method for analysis by the final review unit.

In the event that this data is to be obtained in this manner the procedures indicated in other sections of this manual are to be followed.

*PROCEDURES FOR BORROW EXCAVATION

1. (a) Check the levels and cross sections in the Original and Final Level Books on Borrow Pit Cross Sections.

   **(b) Plot and check the original and final ground lines.

   **(c) Planimeter and check areas.

   **(d) Compute and check the yardage (cubic meters).

2. (a) Check for any disallowed fill on the borrow pit cross sections and mainline cross sections.

   (B) Planimeter and check areas; compute and check the yardage (cubic meters) of all disallowed fill.

3. Subtract 2.(b) from l.(d) to obtain the pay quantity on borrow excavation.

   * - Not applicable on "Minimum or No Plan" projects.

   ** - Certain elements of these steps will be accomplished by means of on Line Remote Tele-processing Terminals.

PROCEDURES FOR BOX CULVERTS

1. Description should include the station, length, size, standard and degree of skew, height of cover, and type of wings.

2. Quantities for both concrete and steel are to be computed using the applicable values for box culverts as indicated in the current edition of Standard Bridge Designs.

NOTE:

1. When a structure is completed without the necessity of altering either the length, size, or number of bars detailed on the plans, we are to pay for the estimated plan quantity, provided the plan and shipping invoice quantities agree within plus or minus one (1) per cent.

2. In the event that an alteration was made in the structure which affected the quantity of reinforcing steel, or in the event that the plan and shipping invoice quantities do not agree within plus or minus one (1) per cent payment must be made for the actual quantity used (as determined by the Project Inspector). (Total length of each size bar multiplied by its theoretical unit weight). The weight of the reinforcing steel used for lapping will not be allowed.

3. Computations should indicate any additional concrete and steel required in both the headwall and curtain wall due to the skew.

4. The transfer of quantities from the diary to the summary should be checked and all totals verified.

PROCEDURES FOR PIPE CULVERTS

1. Check the length of pipe, the size of pipe, the type of pipe, the number of joints and the length of each, and the number and type of endwells.

2. The number of joints times the individual length should equal the total pay length of pipe. Payment for partial joints should be in accordance with the Construction Manual.

3. Check the amount of concrete used for endwalls against the standard quantities for diameter and type of pipe used.

4. Check the transfer of quantities from diary to summary and check the totals.

5. A Materials Tech. Supervisor should check the total quantity to ascertain that the total quantity used has been tested.

Note: In order to properly index and inspect the Department's many structures, all structures which are incorporated into a highway project and which exceed 36 square feet (3.3 square meters) in opening, shall be brought to the attention of the appropriate district Structures and Bridge Engineer in order that a structure number may be assigned or appropriate revision to the Structure Inventory System be made. This includes new structures, replacing, improving, or otherwise altering an existing structure by the Structures and Bridge and/or the Location and Design Divisions.

In accordance with memorandum from Mr. C. O. Leigh to District Engineer dated September 4, 1985.

REVIEW PROCEDURES ON WORK ORDERS (60" (1,500 mm) PIPE USED AS EXAMPLE)

1. Before making a final review of drainage items, review all work orders to ascertain that all work orders apply to the drainage items.

2. Check the Inspector's alignment against the alignment notes under the corresponding station number.

3. Check all notes in the diary against the applicable pipe summary (separate summary shown for each work order).

4. Verify the total quantity by adding the items in pipe summary or work order summary.

5. Check the total pay quantity from the pipe summary or the work summary against the actual quantity listed in the "reasons for differences" and then indicate the actual quantity used to the total pay quantity, if different.

6. Upon completion of the Road Design Final Review of all items, a Materials Tech. Supervisor shall visit the Road Design Section at which time he is furnished with the final quantity from the pipe summary or work order summary for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Materials Tech. Supervisor shall indicate the actual quantity in agreement with the final quantity shown in pipe summary or work order summary.

REVIEW PROCEDURES FOR END SECTIONS

1. Check the diary for all drainage items. Check the Inspector's alignment sketch against the alignment notes under the corresponding station number.

2. Check the alignment notes in the diary against the end section summary.

3. Verify the total quantity by adding the end section summary.

4. Check the total pay quantity from the end section summary against the actual quantity in "reasons for differences" and change the actual quantity used to the total pay quantity, if they are different.

5. Upon completion of the Road Design Final Review, a Materials Tech. Supervisor shall visit the Rood Design Section at which time he is furnished with the final pay quantity from the End Section Summary for checking against the total quantity tested in the Materials Notebook. If actual quantity used in the Materials Notebook is different, the Mat'ls. Tech. Supervisor indicates the actual quantity used in the Materials Notebook in agreement with the Final Pay Quantity in the End Section Summary.

REVIEW PROCEDURE FOR DROP INLETS

1. Check the diary for all drainage items.

2. Check the inspector's alignment sketch against the alignment notes under the corresponding station number.

3. Check the alignment notes in the diary against the drop inlet summary. Compare the plan height to the actual height and apply section 302.04 if necessary.

4. Verify the total quantity by adding the drop inlet summary.

5. Check the total pay quantity from the drop inlet summary against the actual quantity in "reasons for differences" and change the actual quantity used to the total pay quantity, if they differ.

PROCEDURES FOR CURBING, COMBINATION CURB AND GUTTER, SIDEWALK, ETC.

1. Notation should include the beginning and ending stations, description, and the length or full dimensions as required. Examine the standards to determine if the dimensioning is adequate, and question the Inspector, if not.

2. Check the transfer of quantities from diary to summary and check the totals.

PROCEDURES FOR LINEAR FOOT (METER) MEASURED ITEMS

1. Notation in the diary should include beginning and ending stations, and sufficient dimensions necessary for determining the actual length used.

2. Check the transfer of quantities from diary to summary and check totals.

PROCEDURES FOR RETAINING WALLS

1. Notations in the diary should include beginning and ending stations, type of wall, and sufficient dimensions for determining the actual volume of concrete or reinforcing steel used.

2. Check the transfer of quantities from diary to summary and check the totals.

PROCEDURES FOR STEPS

1. Notations should include the station, width, and number. If standard, the pay quantities may be obtained directly from the tables in the book of standards. If not standard, full dimensions must be given and computations shown for the concrete and reinforcing steel quantities.

2. Check the transfer of quantities from diary to summary and verify the totals.

PROCEDURES FOR FENCING

1. Notation in the diary should include beginning and ending stations, type, length, location and number of lines or corner brace units, and the number, type and size of gates.

2. Check the transfer of quantities from diary to summary against the work book and verify the totals.

3. Check the summary total against the total shown in the Inspector's "reasons for differences."

PROCEDURES FOR GUARDRAIL

1. Check the stations and the lengths shown for guardrail in alignment sketches and notes against the entries in the summary.

2. Check the summary total

3. Check the summary total against the total shown in the Inspector's "reasons for differences."

4. Check with the Materials Division to confirm that the quantities tested or certified lots equal or exceed the pay quantities.

PROCEDURES FOR ST'D. AND RAD. CURB

1. Check the Stations and the lengths of curbing included in the alignment notes and sketches against the Inspector's summary.

2. Check the summary total

3. Check the summary total against the total shown in the Inspector's reasons for differences.

PROCEDURES FOR CONCRETE, CLASS A-4 (CLASS 30), BRIDGE APPROACH SLAB

1. Review the roadway plans to determine which bridges have Bridge Approach Slabs (concrete Class A4) (Class 30). When the bridge approach slabs are on the Bridge Contract, bridge plans must be reviewed.

2. Check the alignment sketches in the diary against the applicable bridge approach plan sheet to determine if bridge approach slabs were built.

3. Check the bridge approach slab (concrete Class A4) (Class 30) summary to determine if the Inspector certified that the subject bridge approach slabs were build according to plans.

4. Using roadway plans, total the quantities shown on the bridge approach slab sheets, check the bridge approach slab (concrete Class A4) (Class 30)summary against the total quantity.

5. Check the total pay quantity from the Bridge Approach Slab Summary against the Actual Quantity in "reasons for differences" in the summary sketchbook.

6. Upon the completion of the Road Design Final Review of all items, a Mat'ls. Tech. Supervisor shall visit the Road Design Section, at which time he is furnished with the final quantity from the Bridge Approach Slab Summary

(concrete Class A4) (Class 30) for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Mat'ls. Tech. Supervisor indicates the actual quantity in agreement with the final quantity shown in the Bridge Approach Slab Summary (concrete Class A4) (Class 30).

PROCEDURES FOR PAVED DITCH

1. Check the stations length, type, and depth shown in the alignment sketches and notes against the computation of sq. yds. (sq. meters) and their entry in the Summary.

2. If the Inspector indicates (by note) that the field measurements show that the paved ditch dimensions are in accord with those shown in the standard, it will be satisfactory to determine the sq. yds. (sq. meters) of surface area by utilizing the values found in the Road Design and Standards.

3. Check the summary total.

4. Check the summary total against the total shown in the Inspector's "reasons for differences."

REVIEW PROCEDURES FOR ALLAYING DUST

1. Check the diary entries against the daily entries on Form C-79.

2. Verify the total quantity.

3. Check the total pay quantity on Form C-79 against the actual quantity in "reasons for differences" and change the actual quantity used to the total pay quantity, if they differ.

REVIEW PROCEDURES FOR LIQUID ASPHALT MATERIAL

1. Verify by adding the total quantity in the Liquid Asphalt Material Summary.

2. Add net gallons (already adjusted to 60°F (15°C) on the invoice) on the invoice to obtain the total quantity shipped.

3. Verify that the total quantity shipped as shown on the invoices equals or exceeds the total quantity shown in the Liquid Asphalt Material Summary.

4. Check the total quantity from the Liquid Asphalt Material Summary against the actual quantity in "reasons for differences" and change the actual quantity used to the total pay quantity, if they differ.

5. Upon completion of the Road Design Final Review of all items, a Materials. Tech. Supervisor shall visit the Road Design Section, at which time they will be furnished with the final quantity from the Liquid Asphalt Material Summary for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Materials. Tech. Supervisor shows the actual quantity used in the materials Notebook in agreement with the final quantity in the Liquid Asphalt Material Summary.

REVIEW PROCEDURES FOR ASPHALT CONCRETE COURSES

1. Check the total quantity TL-102A.

2. Check the deductions that are required because they are outside allowable tolerances and check the transfer of deductions against the Summary (where applicable).

3. Check the total pay quantity from the Asphalt Conc. Summary against the actual quantity in "reasons for differences" and change the actual quantity used to the total pay quantity if they differ.

4. Upon completion of the Road Design Final Review of all items, a Mat'ls. Tech. Supervisor shall visit the Road Design Section, at which time he is furnished with the final quantity from the Asphalt Conc. Summary (prior to application of overdepth quantity deduction) for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Mat'ls. Tech. Supervisor shows the actual quantity used in the Materials Notebook in agreement with the final quantity in Asphalt Conc. Summary.

PROCEDURES FOR CR. RUN AGGR.

1. Check the quantity total of tickets against TL-102A.

2. Check the summary total.

3. Check the summary total against the total shown in the Inspector's "reasons for differences."

4. Check with the Materials Division to confirm that the quantities tested equal or exceed pay quantities.

REVIEW PROCEDURES FOR SUB-BASE COURSE AND AGGREGATE BASE MATERIAL

1. Check the total quantity added each day against Form TL102A.

2. Compute the reduction in quantity for overdepth on sub-base course aggregate base and apply it as a deduction to the total quantity in the summary.

3. Verify the total pay quantity after applying the above quantity adjustment in step 4.

4. Check the total pay quantity from sub-base course aggregate base summary against the actual quantity in "reasons for differences" and change the actual quantity used to the total pay quantity, if they differ.

5. Upon completion of the Road Design Final Review of all items, a Materials. Tech. Supervisor shall visit the Road Design Section, at which time he will be furnished with the adjusted final quantity from the Sub-base Course and Aggregate Base Summary (prior to the application of over-depth quantity deduction) for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the Materials Notebook is different, the Materials. Tech. Supervisor shows the actual quantity used in the materials Notebook agreement with the final quality in the Sub-base Course and Aggregate Base Summary.

PROCEDURES FOR REDUCTION IN PRICE ON ITEMS FOR NON-COMPLIANCE

1. Upon completion of the final review of all items remove all memorandums for price reduction for non-compliance from the Road Design Correspondence Folder and the District Administrator's General Correspondence Folder. Only after this stage can a pencil copy of the final estimate be prepared.

2. Contact the Mat'ls. Tech. Supervisor in the Materials Division to confirm that all memorandums for price reduction for non-compliance have been issued on the project.

3. Compare all memorandums for price reduction for non-compliance obtained from the Road Design Correspondence Folder to the ones obtained from the General Correspondence Folder to determine if all the above memorandum issued have been received.

4. Separate (by item) all memorandums for price reduction for non-compliance.

5. Compute the price reduction (for each individual memoranda) on each memorandum. (Tons (metric tons) represented on the memorandum x price per ton (metric ton) on the contract x penalty points percentage = price reduction.)

6. Total all price reductions for each item to obtain the total dollar deduction for Aggr. and Bit. Conc.

7. Transfer the price adjustment for non-compliance to the final estimate pencil copy.

PROCEDURES FOR FERTILIZER & LIME

1. Total the invoices by adding the Total Shipped on the invoices.

2. Check the Total Tons (metric tons) Shipped on the invoices against the total tons (metric tons)shown in the Summary to verify that the Total Tons (metric tons) Shipped equals or exceeds the Total Tons (metric tons) Used.

3. Check for any changes in fertilizer type and make adjustments for the ratio used.

4. Check the total pay quantity in the Summary against the actual quantity shown in "reasons for differences."

5. Upon completion of the Road Design Final Review of all Items, a Mat'ls. Tech. Supervisor shall visit the Road Design Section, at which time he will be furnished with the final quantity from the Summary for checking against the total quantity tested in the Materials Notebook. If the actual quantity used in the materials Notebook is different, the Mat'ls. Tech. Supervisor should show the actual quantity in agreement with the final quantity shown in the Summary.

PROCEDURES FOR SEEDING

The inspector will document regular seeding (which includes mulch) or overseeding (which does not include mulch) on Form C-79 and in the summary of quantities used on the project. This documentation will serve as a record of the quantity of seed used and when completed, the tag on the bag of seed may be disposed of.

PROCEDURES FOR CONCRETE CLASS A-4 (CLASS 30)

1. Check the applicable sheets in the Structure Diary to obtain the total quantity. The quantity in the Structure Diary should be checked against the total in the Summary. Check the General Notes Section for the Inspector's certification that superstructure was constructed in compliance with plans and that plan quantities are allowed. The deck probe depths should be shown in the general notes. The Bridge Section will compute the Allowable Overdepth Quantity.

2. Check the Bridge Plans to obtain the total plan quantity for Concrete Class A-4 (Class 30).

3. Check the total plan quantity on the Bridge Plans against the Concrete Class A-4 (Class 30)Total Quantity shown in the Summary. The Bridge Section then adds the total computed overdepth quantity to the total quantity shown in the Summary to obtain the final pay quantity.

4. Check the total pay quantity from the summary against the actual quantity shown in "reasons for differences." The Bridge Section then adjusts the total quantity in "reasons for differences" to reflect the final pay quantity from the summary.

5. Upon completion of the L&D Final Review of all Items, a Materials Technical Supervisor shall visit the L&D Section, at which time he will be furnished with the final quantity from the Summary. This is to be used for checking against the components tested (cement, fine aggregate, course aggregates and water) and shown in the Materials Notebook to determine if the total quantities of components tested equals or exceeds the final pay quantity.

PROCEDURES FOR REINF. STEEL

1. Check the plans for revision.

2. Check the correspondence and the Inspector's General Notes for any authorized adjustments to the plan quantity.

3. Check for a notation that the Superstructure or Substructure was constructed in accordance with plans and plan quantities allowed.

4. If there are no revisions or adjustments, then pay for the plan quantity.

5. If there are revisions or adjustments, apply these to the plan quantity to equal the pay quantity.

6. Check the total in the Summary against the total shown in the Inspector's "reasons for differences."

7. Check with the Materials Division to confirm that the quantities tested equal or exceed the pay quantity.

PROCEDURES FOR PILES

1. Check the information on Pile Driving Records against the entries in the Summary.

2. Total the Pay Length Columns to check the Inspector's total.

3. Check the entry of the total in the Summary.

4. Check the total in the Summary to confirm that the total in the summary was transferred correctly to the Inspector's "reasons for differences."

5. Check with the Materials Division to confirm that the quantities tested or equals exceeds the pay quantity.

PROCEDURES FOR STRUCTURE EXCAVATION

1. Check the Inspector's Original Ground Notes in the Bridge Diary for accuracy of extensions (H.I. - Rod Reading = Original Ground Elevation).

2. Review the Bridge Plans for bottom of footing elevations.

3. Verify the cut depths in the Original Ground Notes in the Bridge Diary by subtracting the Bottom of Footing Elevation from the Original Ground Elevation.

4. Verify the Cut Depths (measured to nearest 0.1' (0.05 meter)) with the Inspector's sketches in the Bridge Diary.

5. Verify that the dimensions in the Inspector's sketches are no more than 18" (450 mm) outside the neat line of the footing concrete lines shown on the Bridge Plans.

6. Verify the Inspector's computations.

7. Total the quantities (by classification) by adding each section's total quantity in the Structure Excavation Notes in the Bridge Diary.

8. Verify the total quantity (by classification) for each substructure unit in Structure Excavation Notes in the Bridge Diary with the total quantities in the Summary.

9. Verify the total quantity (by classification) by adding the structure excavation in the General or Actual quantity Summary.

10. Check the total pay quantity from the Summary against the Actual Quantity in "reasons for differences."

LIST OF ACCURACY REQUIRED ON CONTRACT ITEMS Daily Entries, Monthly Estimates And Finals		
Item	**Imperial**	**Metric**
Aggr. Base Material	0.01 Ton	0.01 MTon
Aggr. Base Material Cem. Stab.	0.01 Ton	0.01 MTon
Aggr., Cover Mat'l	0.01 Ton	0.01 MTon
Aggr., Cr. Run	0.01 Ton	0.01 MTon
Allaying Dust	0.5 Hr.	0.5 Hr.
Bearing Plates	Lb.	KG
Bedding Mat., Aggr.	0.01 Ton	0.01 MTon
Bedding Mat., Local	0.1 C.Y.	0.1 CuM
Bridge Drainage Apron and Chute	0.1 S.Y.	0.1 SqM
Cement Conc., Latex Portland	0.1 C.Y.	0.1 CuM
Cement, Hydraulic	0.1 Ton	0.01 MTon
Channelizing Device	Day	Day
Chloride, Calcium or Sodium	0.01 Ton	0.01 MTon
Clearing and Grubbing	0.05 Acre	0.01 HA
Conc. Cl.	0.1 C.Y.	0.1 CuM
Conc. Entr. Pave	0.1 S.Y.	0.1 SqM
Concrete Cribbing	Cu. Ft.	0.1 CuM
Concrete Parapet	0.1 L.F.	0.1 M
Conductor Cable	L.F.	0.1 M
Conduit	0.1 L.F.	0.1 M
Curb & Gutter Pl. & Rad.	L.F.	0.1 M
Curb - Removal	L.F.	0.1 M
Dampproofing	S.Y.	0.1 SqM
Directional Island Curb	0.1 L.F.	0.1 M
Drilled Holes (for drilled-in caissons)	L.F.	0.1 M
Elastomeric Expansion Dam	0.1 L.F.	0.1 M
Electronic Arrow	0.5 Hr.	0.5 Hr.
Embankment	C.Y.	CuM

LIST OF ACCURACY REQUIRED ON CONTRACT ITEMS Daily Entries, Monthly Estimates And Finals		
Item	**Imperial**	**Metric**
Epoxy Resin Coating	0. 1 S.Y.	0.1 SqM
Erosion Control Treatment	0.01 Ton	0.01 MTon
Excavation, Borrow	C.Y.	CuM
Excavation, Minor Structure	C.Y.	CuM
Excavation, Regular	C.Y.	CuM
Excavation, Special Minor Struct.	0.1 C.Y.	0.1 CuM
Excavation, Structure	0.1 C.Y.	0.1 CuM
Excavation, Trench	L.F.	0.1 CuM
Excavation, Undercut	C.Y.	CuM
Fence, Chain-Link	0.1 L.F.	0.1 M
Fence, Pedestrian	0.1 L.F.	0.1 M
Fence, Reset	L.F.	0.1 M
Fence, Silt	0.1 L.F.	0.1 M
Fence, Temporary Silt	0.1 L.F.	0.1 M
Temp. Filter Barrier	L.F.	0.1 M
Fence, Wire	L.F.	0.1 M
Fertilizer	0.01 Ton	0.01 MTon
Field Office	Month	Month
Filter Cloth	S.Y.	0.1 SqM
Flagger	0.5 Hr.	0.5 Hr.
Guardrail	0.1 L.F.	0.1 M
Guardrail, Terminal GR-6	L.F.	0.1 M
Guardrail, Terminal GR-7	Each	Each
Gutter, Cem. Conc.	0.1 S.Y.	0.1 SqM
Gutter, Entrance	0.1 S.Y.	0.1 SqM
Gutter, Grouted Rubble	0.1 S.Y	0.1 SqM
Handrail	0.1 L.F.	0.1 M
Herbicide Spraying	0.1 Unit	0.01 Unit (Unit=3,785 Liters)

LIST OF ACCURACY REQUIRED ON CONTRACT ITEMS Daily Entries, Monthly Estimates And Finals		
Item	**Imperial**	**Metric**
Lime	0.01 Ton	0.1 MTon
Liquid Asphalt Mat.	Gal.	L
Lumber, Treated	0.01 MFBM	0.1 CuM
Lumber, Untreated	0.01 MFBM	0.1 CuM
Manhole	0.1 L.F.	0.1 M
Manipulation	S.Y.	0.1 SqM
Median Barrier	0.1 L.F	0.1 M
Median Barrier Service (Conc.)	0.1 L.F.	0.1 M
Median Strip	0.1 L.F.	0.1 M
Mowing	0.5 Hr.	0.5 Hr.
Mulch	0.1 Unit	0.1 Unit (Unit=10 SqM)
Obscuring Old Road	0.1 Unit	0.1 Unit (Unit=100 SqM)
Overhaul	Sta. Yd.	Sta. CuM
Patching, Type	S.Y.	0.1 SqM
Patching, Type D	Gallon	L
Paved Ditch	0.1 S.Y.	0.1 SqM
Paved Flume	0.1 S.Y.	0.1 SqM
Pavement, Asphalt Concrete	0.01 Ton	0.01 MTon
Pavement Conc	0.1 S.Y.	0.1 SqM
Pavement, Demolition	S.Y.	SqM
Pavement, Street Conn	0.1 S.Y.	0.1 SqM
Pavement Planing	0.1 S.Y.	0.1 SqM
Pavement Restoration	0.1 Ton	0.01 MTon
Pavement Marking	L.F.	0.1 M
Piling	0.1 L.F.	0.1 M
Piling, Sheet	S.F.	0.1 SqM
Pilot Truck	0.5 Hr.	0.5 Hr.
Pipe, Jacked	0.1 L.F.	0.1 M

LIST OF ACCURACY REQUIRED ON CONTRACT ITEMS Daily Entries, Monthly Estimates And Finals		
Item	**Imperial**	**Metric**
Pipe Culvert	L.F.	0.1 M
Pipe, Str. Plate	0.1 L.F.	0.1 M
Pipe Water Main	L.F.	0.1 M
Plant Laboratory	Month	Month
Pneumatically Applied Mortar	S.F.	0.1 SqM
Pole, Sign	L.F.	0.1 M
Pole, Signal	L.F.	0.1 M
Porous Backfill	C.Y.	0.1 CuM
Post, Sign	L.F.	0.1 M
Performed Elastomeric Joint Sealer	L.F.	0.1 M
Prest. Conc. Panel	S.F.	0.1 SqM
Protective Covering	S.Y.	0.1 SqM
Railing	0.1. L.F.	0.1 M
Reinf. Steel	LB.	KG
Removal of Bituminous Conc. Overlay	S.Y.	SqM
Retaining Structure	0.1 S.F.	0.1 SqM
Retaining Wall	0.1 C.Y.	0.1 CuM
Riprap, Conc. Slab	0.1 S.Y.	0.1 SqM
Riprap, Conc. in Bags	0.1 C.Y.	0.1 CuM
Riprap, Dry	0.01 Ton	0.01 MTon or 0.1 SqM
Riprap, Dumped	0.01 Ton	0.01 MTon or 0.1 SqM
Riprap, Erosion Control	0.01 Ton	0.01 MTon or 0.1 SqM
Riprap, Erosion Control Treatment	C.Y.	0.1 CuM
Riprap, Grouted	0.01 Ton	0.01 MTon
Riprap, Mortared	S.Y.	0.1 SqM
Riprap, Stone	0.01 Ton	0.01 MTon
Riprap, Bedding	S.Y.	0.1 SqM
Riprap, Ditch Liner	S.Y.	0.1 SqM

LIST OF ACCURACY REQUIRED ON CONTRACT ITEMS Daily Entries, Monthly Estimates And Finals		
Item	**Imperial**	**Metric**
Rubble, Dry Masonry	0.01 Ton	0.01 MTon
Rubble, Mortar Masonry	C.Y.	0.1 CuM
Saw Cut	L.F.	0.1 M
Sealing Cracks	L.F.	0.1 M
Seeding, Over	Lb.	KG
Seeding, Regular	Lb.	KG
Selective Tree Removal, Trimming & Cleanup	0.1 Acre	0.01 HA
Sidewalk, Asphalt Concrete	0.01 Ton	0.01 MTon
Sidewalk, Saw Cut	L.F.	0.1 M
Sidewalk, Cement Conc.	0.1 S.Y.	0.1 SqM
Sign	0.1 S.F.	0.01 SqM
Silt Barrier, Baled Straw	L.F.	0.1 M
Slope Protection, Conc. Block	0.1 S.Y.	0.1 SqM
Slope Protection, Conc. Slab	0.1 S.Y.	0.1 SqM
Sodding	S.Y.	0.1 SqM
Span Wire	L.F.	0.1 M
Steel Grid Floor	S.F.	0.1 SqM
Surface Preparation Cl	S.Y.	0.1 SqM
Temporary Detour	L.F.	0.1 M
Topsoil	0.1 Acre	0.01 HA
Trainees	0.5 Hr.	0.5 Hr.
Underdrain	L.F.	0.1 M
Wall, Sound barrier	0.1 S.F.	0.01 SqM
Warning Lights	Day	Day
Watering	0.1 Unit	0.1 Unit (Unit= 3,785 Liters)
Waterproofing	S.Y.	0.1 SqM
Welded Wire Fabric	Lb.	KG